Marni Metzler

Unit- Hydroponics

Theme-Foundation

Topic-Lab Activity-Making a Hydroponic plastic bottle window farm

**Aim:**

How can we grow produce without using any soil?

**Objective:**

Students will create Hydroponic window farms in order to use them to grow produce without using soil.

**Do Now:**

SMART Board Interactive Toolkit-Turn and Talk with group - decide in your group which terms are relevant to our topic- hydroponics, and which are not. Use your own personal whiteboard to write a T-chart containing the related and non-related topics. Hydroponics Not Hydroponics

**Motivation:**

Show my students my sample of the 3 plant window farm working in the filled spackle bucket.

**Guiding Questions:**

* Why would we grow produce without soil?
* Who (what communities) has a greater need for growing produce without soil?

**Mini Lesson:**

* Hydroponics information-SMART Notebook presentation
* Discuss Vocabulary
* Discuss Guiding Questions-questions and answers typed into NOTES on Smart Notebook Interactive Toolkit 2.0

**Medial-Summary Review/Assessment**-NOTES-Smart Notebook Interactive Toolkit 2.0

**Guided Practice / Lab Activity**-

Read/discuss procedure - bulleted on Smartboard notebook

**Procedure:**

1. Trace the cap of your water bottle onto the bottom of all 3 water bottles-creating one of your

lines on top of the severe already made in the plastic.

2. Use a scissors to cut out the rest of the circle made after tracing your bottle cap.

3. Cut out with your scissors a large rectangular hole on one side of your bottle

(Be Sure to View the Sample before creating this hole!)

4. Plastic cups with ready- made holes on sides and/or bottom (3 per project) inside each hole

made in each of the water bottles OR have students use a hole-making hand turning

screwdriver to create 3 holes in all cups by stacking the cups and then making the holes.

5. Place each bottle nose into the opposite end of a water bottle (the nose sinks and stays into the

hole)

6. Use duct tape to cover the top of the outside of the bottle (from the nose to the cut out

portion) - SEE Sample

7. Cut blue tubing so that a piece is slightly longer than the length of your 3 water bottles

altogether.

8. Attach the blue tubing to a wooden stick to stabilize the unit via plastic tie fasteners

9. Place 2 pins each into a small piece of precut tubing and attach to blue tubing

10. Wrap the m together with Plumber's tape.

11. Find the 2 preset slices in the tubing at the bottom of one end

12. Insert the pins into each one and push the pin in as far as it can go

13. Wrap these ends with the Plumber's tape so that there are no openings.

14. Place the tubing and the bottom opening (nose) into your spackle bucket filled with water.

15. Attach the loose ends of your 2 tubes into the ends of the Petco filter.(Make sure it is

plugged into an outlet in the wall).

16. See the water filter through the tubing to the top of your Window Farm and filter through

each water bottle down to the next (If not...wrap your tubing together better with the

Plummer's tape)

17. Place a solid plant holder material into each cup.

18. Place a plant of choice into each holder into the cups.

19. GROW YOUR PLANTS!!!

**Materials:**

* **Empty Spackle Buckets** (1 per project)
* **Plumber's Tape**
* **Basketball replacement pins** (2 per project)
* **empty plastic water bottles** (3 per project)
* **thin Sharpie markers**
* **Plastic cups** **with holes on sides and/or bottom** (3 per project)

***OR***

* **hole-making hand turning screwdriver** to create 3 holes in all cups by stacking the cups and then making the holes.
* **blue tubing**
* **clear tubing**
* **plastic tie fasteners** (3-6 per project-depending on diameter of the water bottles used)
* **Petco filter**
* **extension cords (possibly)**
* **solid plant holders (non soil)**

**Presentations/Summary:**

Have each student group discuss their end result, the process, how they felt about the process, how they feel about their end result, reflections on how they could improve the project, process, experience, reflection on worthiness /purposefulness of project, who could use this technique and how it could be used

**Next Steps:**

Build an Aponic Water Tank Ecosystem (Aquaculture and Hydroponics)

**Homework:**

Research & Write Exploring Further: Research on the Internet alternative hydroponic growing ideas. Choose one. Explain why you chose this idea, the process of making it happen and its function, purpose and where you think it could best be utilized.

**Assessments Used:**

* Diagnostic Do Now
* Formative **a.** Rubric for completion of project through process of procedure completion

**b**. medial-summary

* Summative Presentation Rubric and Checklist

**Differentiation Used:**

* Intrapersonal intelligence use
* Interpersonal intelligence use
* Verbal-linguistic intelligence use
* Naturalist intelligence use
* spatial intelligence use-using visual mapping to create a project of own
* Mathematical-logical intelligence use-sequencing of steps of procedure
* Kinesthetic intelligence use
* Tactile intelligence use
* Auditory and Visual learning style use-through Smartboard
* Learner Readiness - through medial summary questions and presentation questions/preparation contingencies will be made as per student population as well as

groupings for Do Now and Lab Activity

**Standards;**

**NYS:**

Standard 1 Scientific Inquiry, Key Idea 2 Standard 1 Engineering Design, Key Idea 1 Standard 2 Information Systems, Key Idea 1 Standard 4 The Living Environment, Key Idea 7

**CCLS:**

WHST

Homework: - W1.a, b, c

Guided Practice: W1.b,c

Mini Lesson: R1.a

**DOE Priority Compentencies:**

Domain 1- Planning and Preparation

* 1e-Designing Coherent Instruction

Domain 2 - the Classroom Environment

* 2b-Establishing a Culture for Learning
* 2d-Managing Student Behavior

Domain 3 - Instruction

* 3b-Using Questioning and Discussion
* 3c-Engaging Students in Learning
* 3d - Using Assessment in Instruction